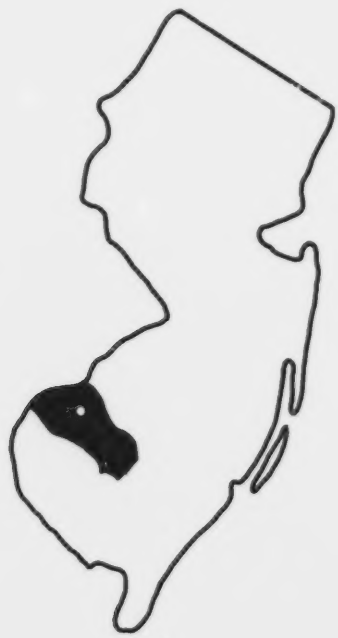
FEMI. 209:340207
ORIGINAL

FLOOD INSURANCE STUDY

COMPLETED
25

TOWNSHIP OF MANTUA, NEW JERSEY
GLOUCESTER COUNTY



MAY 3, 1982

Federal Emergency Management Agency

COMMUNITY NUMBER - 340207

TABLE OF CONTENTS

		Page
1.0	INTRODUCTION	1
	1.1 Purpose of Study	1
	1.2 Authority and Acknowledgements	1
	1.3 Coordination	1
2.0	AREA STUDIED	2
	2.1 Scope of Study	2
	2.2 Community Description	2
	2.3 Principal Flood Problems	4
	2.4 Flood Protection Measures	5
3.0	ENGINEERING METHODS	5
	3.1 Hydrologic Analyses	5
	3.2 Hydraulic Analyses	6
4.0	FLOOD PLAIN MANAGEMENT APPLICATIONS	7
	4.1 Flood Boundaries	7
	4.2 Floodways	8
5.0	INSURANCE APPLICATION	11
	5.1 Reach Determinations	11
	5.2 Flood Hazard Factors	11
	5.3 Flood Insurance Zones	13
	5.4 Flood Insurance Rate Map Description	13

BEST DOCUMENT AVAILABLE

TABLE OF CONTENTS - continued

	Page
6.0 OTHER STUDIES	14
7.0 LOCATION OF DATA	14
8.0 BIBLIOGRAPHY AND REFERENCES	14

FIGURES

Figure 1 - Vicinity Map	3
Figure 2 - Floodway Schematic	10

TABLES

Table 1 - Summary of Discharges	6
Table 2 - Floodway Data	9
Table 3 - Flood Insurance Zone Data	12

EXHIBITS

Exhibit 1 - Flood Profiles
Mantua Creek — Panels 01P - 02P

Exhibit 2 - Flood Boundary and Floodway Map Index

Exhibit 3 - Flood Boundary and Floodway Map

PUBLISHED SEPARATELY:

Flood Insurance Rate Map Index

Flood Insurance Rate Map

BEST DOCUMENT AVAILABLE

FLOOD INSURANCE STUDY
TOWNSHIP OF MANTUA, NEW JERSEY

1.0 INTRODUCTION

1.1 Purpose of Study

This Flood Insurance Study investigates the existence and severity of flood hazards in the Township of Mantua, Gloucester County, New Jersey, and aids in the administration of the National Flood Insurance Act of 1968 and the Flood Disaster Protection Act of 1973. This study will be used to convert Mantua to the regular program of flood insurance by the Federal Emergency Management Agency (FEMA). Local and regional planners will use this study in their efforts to promote sound flood plain management.

In some states or communities, flood plain management criteria or regulations may exist that are more restrictive or comprehensive than those on which these federally-supported studies are based. These criteria take precedence over the minimum federal criteria for purposes of regulating development in the flood plain, as set forth in the Code of Federal Regulations at 44 CFR, 60.3. In such cases, however, it shall be understood that the state (or other jurisdictional agency) shall be able to explain these requirements and criteria.

1.2 Authority and Acknowledgements

The source of authority for this Flood Insurance Study is the National Flood Insurance Act of 1968 and the Flood Disaster Protection Act of 1973.

The hydrologic and hydraulic analyses for this study were performed by URS Company, Inc. for the Federal Emergency Management Agency, under Contract No. H-4808. This work was completed in February 1981.

1.3 Coordination

An initial Consultation and Coordination Officer's (CCO) meeting was held on May 16, 1978, to determine the streams requiring detailed study. This meeting was attended by representatives of the FEMA, URS Company, Inc. (the study contractor) and the Township of Mantua.

A search for basic data was made at all levels of government, including local officials. In November 1978 a letter was submitted to the mayor and town engineer requesting any available cross sections and profiles, topographic and drainage maps, recorded flood marks from past storms,

BEST DOCUMENT AVAILABLE

local flood protection improvements that are in existence or being planned, information pertaining to the township's history, available bench marks, and any other information which the township would like included in the study.

An intermediate CCO meeting was held on February 17, 1981, at the Gloucester County offices in Clayton, New Jersey. Local officials were invited to review and comment upon the preliminary delineations and profiles which were presented by the FEMA and the study contractor. The results of the study were reviewed at the final CCO meeting held on December 15, 1981, and attended by representatives of the FEMA, the study contractor, and the Township of Mantua.

2.0 AREA STUDIED

2.1 Scope of Study

This Flood Insurance Study covers the incorporated area of the Township of Mantua, Gloucester County, New Jersey. The area of study is shown on the Vicinity Map (Figure 1).

Mantua Creek was studied by detailed methods from the downstream corporate limits to State Route 45. The areas studied by detailed methods were selected with priority given to all known flood hazard areas and areas of projected development and proposed construction for the next five years, through February 1986.

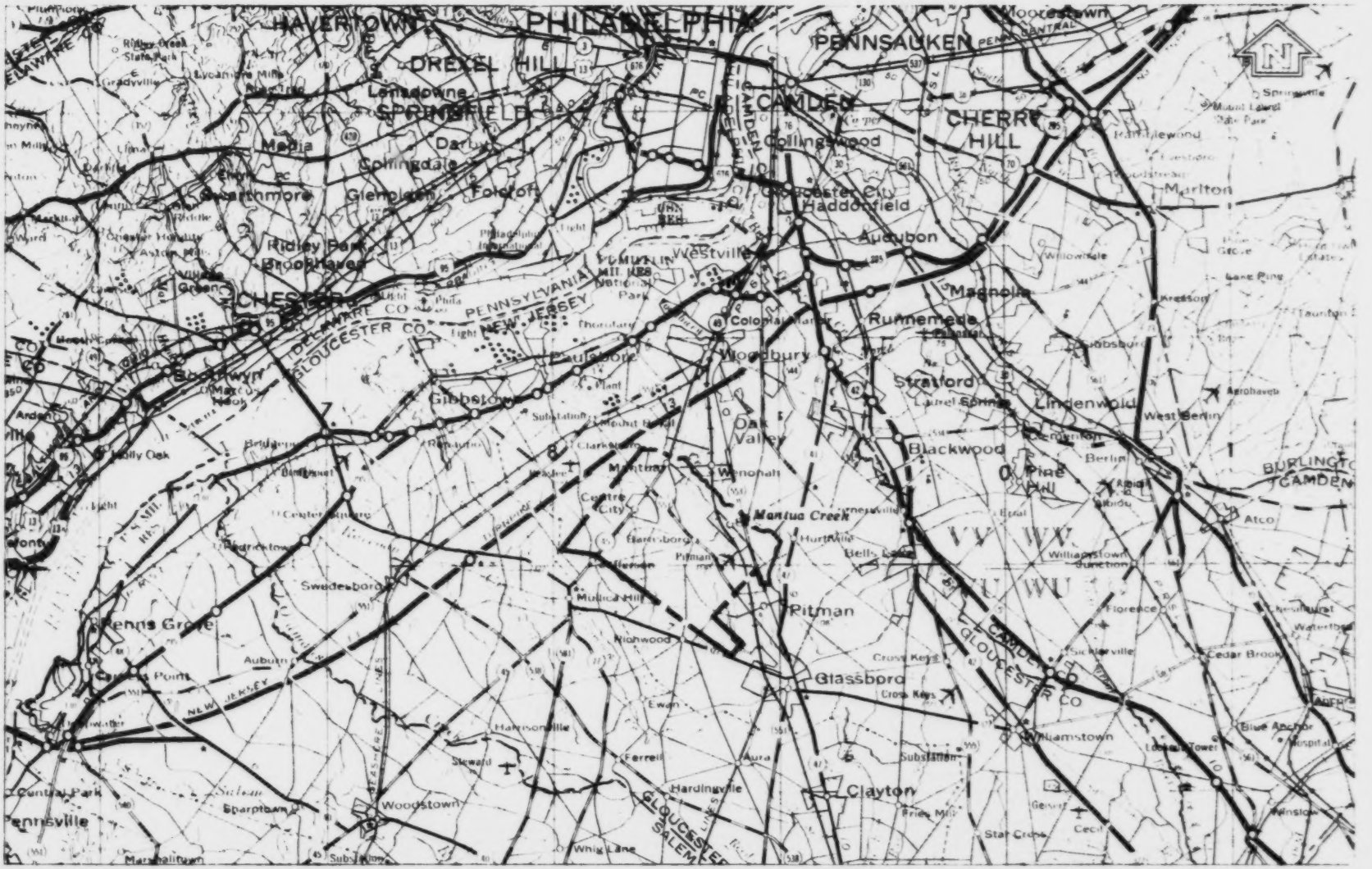
Edwards Run, the upper reaches of Mantua Creek, Chestnut Branch, and several unnamed tributaries to these streams were studied by approximate methods. Approximate methods of analysis were used to study those areas having low development potential and minimal flood hazards as identified at the initiation of the study. The scope and methods of study were proposed to and agreed upon by the FEMA.

2.2 Community Description

The Township of Mantua is located in Gloucester County, approximately 12 miles southwest of Camden, New Jersey. The township covers 16 square miles and is bordered on the north by the Borough of Wenonah and the Townships of Deptford and West Deptford, on the east by the Townships of Deptford and Washington and the Boroughs of Pitman and Glassboro, on the south by the Township of Harrison, and on the west by the Township of East Greenwich. The four major communities within the township are Mantua, Centre City, Sewell, and Barnsboro. The 1977 estimated population for the township was 10,258 (Reference 1). After substantial growth in the 1960s and early 1970s, the rate of development has now stabilized.

BEST DOCUMENT AVAILABLE

BEST DOCUMENT AVAILABLE


HAVERTOWN
PHILADELPHIA
PENNSAUKEN
DREXEL HILL
Lansdowne
SPRINGFIELD
CAMDEN
CHERRY HILL
Media
Collingswood
Collingdale
Glenolden
Folcroft
Swarthmore
Ridley Park
Brookhaven
Westville
Audubon
Magnolia
Runnemede
CHESTER
PENNSYLVANIA
NEW JERSEY
DELAWARE CO
GLOUCESTER CO
Woodbury
Gibbstown
Oak Valley
Stratford
Lindenwold
Blackwood
Pine Hill
Mantua Creek
Swedesboro
Penns Grove
Pitman
Glassboro
Williamstown
Clayton
Woodstown
Pennsville
Central Park
Harrisonville
Hardingville
Whig Lane
Atco
Cedar Brook
Blue Anchor
Winslow
Star Crest
Cecil
Aura
Ferrell
Sharptown
Richwood
Auburn
Repaupo Point
Marshallstown
Hurffville
Bells Corner
Williamstown Junction
Florence
Cross Keys
Sicklerville
Berlin
West Berlin
Aerohaven
Abbott
Lake Pine
Kressson
Marlton
Moorestown
Mount Laurel
Spring Valle
Willowdale
Taunton
Haddonfield
Collingswood
Foster City
Colonial Manor
Runnemede
Woodbury
Wenonah
Mantua
Centre City
Clarksboro
Harrisonville
Pitman
Ewan
Skeeal
Substation
Whig Lane
Brick Mill
Gen
Cecil
Star Crest
Winslow
Blue Anchor
Hospital
Cedar Brook
Sicklerville
Florence
Williamstown
Williamstown Junction
Bells Corner
Hurffville
Cross Keys
Glassboro
Pitman
Richwood
Auburn
Repaupo Point
Penns Grove
Swedesboro
Mullica Hill
Harrisonville
Woodstown
Sharptown
Pennsville
Central Park
Marshallstown
Whig Lane
Hardingville
Clayton
Aura
Ferrell
Skeeal
Substation
Atco
Cedar Brook
Blue Anchor
Winslow
Star Crest
Cecil
Brick Mill
Gen
Williamstown
Lindenwold
West Berlin
Berlin
Aerohaven
Abbott
Pine Hill
Blackwood
Oak Valley
Stratford
Laurel Springs
Runnemede
Magnolia
Audubon
Haddonfield
Foster City
Colonial Manor
Collingswood
Marlton
Moorestown
Mount Laurel
Spring Valle
Willowdale
Taunton
Lake Pine
Kressson
Westville
Brookhaven
Ridley Park
Folcroft
Glenolden
Collingdale
Darby
Media
Swarthmore
Lansdowne
DREXEL HILL
HAVERTOWN
PHILADELPHIA
PENNSAUKEN
CAMDEN
CHERRY HILL
CHESTER
PENNSYLVANIA
NEW JERSEY
DELAWARE CO
GLOUCESTER CO
CAMDEN CO
BURLINGTON CO
Mantua Creek
Oak Valley
Gibbstown
Paulsboro
Woodbury
Wenonah
Mantua
Centre City
Clarksboro
Swedesboro
Penns Grove
Pitman
Glassboro
Williamstown
Clayton
Woodstown
Pennsville
Central Park
Harrisonville
Hardingville
Whig Lane

The Township of Mantua was organized in 1853 when it separated from the Township of Greenwich. The Village of Mantua began as a plantation in 1750, however it later became a shipping terminal at the head of navigation on Mantua Creek. The Village of Sewell began in 1885 as a real estate development known as Green Lawn. A large chicken hatchery was established in 1919, but has since closed. Today the township is an area of farms and small residential communities. Most of the drainage within the township is to Edwards Run and Mantua Creek and its tributaries.

The Township of Mantua is located in the Inner Plain of the Atlantic Coastal Plain physiographic province. This inner plain is separated from the remainder of the Coastal Plain by a cuesta (ridge) which extends from Atlantic Highlands, New Jersey, through Beacon Hill to Mullica Hill, in the neighboring Township of Harrison. This ridge line passes near the Township of Mantua, therefore slopes in the township are some of the steepest, and elevations the highest, in the county. The inner plain is the lowland north and west of the cuesta's steep slope with drainage to the Delaware River, and the outer plain is the cuesta's very gentle other slope with drainage to the Atlantic Ocean or Delaware Bay. Both parts of the Coastal Plain share similar traits such as unconsolidated clays, sands, marls and gravel, but there is a greater proportion of clays in the sediments of the Inner Coastal Plain.

The Coastal Plain is geologically the youngest, softest, and least resistant to erosion, and topographically the flattest and lowest area in the state. The Inner Coastal Plain is part of an area of high population density and urban development. The extent of growth in the region will depend on the development of transportation routes and additional crossings of the Delaware River and Bay.

Annual precipitation in this area is approximately 42 inches per year. The area has a temperate climate with an annual average temperature of 55 degrees Fahrenheit (°F).

2.3 Principal Flood Problems

The Mantua Creek basin has suffered the greatest flood damages of any area of Gloucester County. In 1940 the worst storm to hit the area since record keeping began caused severe damage in the Villages of Mantua, Barnsboro, and Sewell. In the Villages of Mantua and Mantua Terrace (located in the neighboring Township of West Deptford), 72 bungalows were flooded to the roof of their porches and a dozen were swept away. In the 0.25 mile flood plain of Mantua Creek, 200 people were left homeless in the Village of Mantua alone. In Sewell, the new electric pumping station on Glassboro Road was flooded to a depth of 7 feet. Pennsylvania Railroad trains were stranded in Sewell by numerous roadbed and bridge

BEST DOCUMENT AVAILABLE

washouts. In Barnsboro, several homes near Tyler's Mill were flooded. County-wide dams on most lakes were breached and there were 15 major road washouts. Based on the gage at Pitman, New Jersey, on Mantua Creek, the storm of 1940 had an estimated discharge of 4,200 cubic feet per second (cfs) and a recurrence interval of over 500 years.

In August 1967, a storm with a gage discharge of 668 cfs and a recurrence interval of under twenty years was the second greatest recorded storm at the Pitman gage. The storm caused about $150,000 in damage in the Mantua Creek watershed.

Today there are only a few structures remaining in the 100-year flood plain of Mantua Creek and its tributaries.

2.4 Flood Protection Measures

There are no existing, proposed, or authorized flood control or related measures in the township, or upstream in the watershed.

3.0 ENGINEERING METHODS

For the flooding source studied in detail in the community, standard hydrologic and hydraulic study methods were used to determine the flood hazard data for this study. Flood events of a magnitude which are expected to be equalled or exceeded once on the average during any 10-, 50-, 100-, or 500-year period (recurrence interval) have been selected as having special significance for flood plain management and for flood insurance premium rates. These events, commonly termed the 10-, 50-, 100-, and 500-year floods, have a 10-, 2-, 1-, and 0.2-percent chance, respectively, of being equalled or exceeded during any year. Although the recurrence interval represents the long-term average period between floods of a specific magnitude, rare floods could occur at short intervals or even within the same year. The risk of experiencing a rare flood increases when periods greater than one year are considered. For example, the risk of having a flood which equals or exceeds the 100-year flood (one-percent chance of annual occurrence) in any 50-year period is about 40 percent (four in ten) and, for any 90-year period, the risk increases to about 60 percent (six in ten). The analyses reported here reflect flooding potentials based on conditions existing in the community at the time of completion of this study. Maps and flood elevations will be amended periodically to reflect future changes.

3.1 Hydrologic Analyses

Hydrologic analyses were carried out to establish the peak discharge-frequency relationships for floods of the selected recurrence intervals for the flooding source studied in detail affecting the community.

BEST DOCUMENT AVAILABLE

For Mantua Creek, peak discharges for the 10-, 50-, 100- and 500-year recurrence intervals were developed using a weighted average of Special Report 38 discharges and log-Pearson Type III discharges from the Pitman, New Jersey, gage located along Mantua Creek (No. 01475000) (References 2 and 3).

Special Report 38 is based on a regression analysis of 103 gages in the State of New Jersey and is used to estimate peak-flood magnitudes having selected recurrence intervals for drainage basins larger than 1.0 square mile with various degrees of urban or suburban development. Parameters used in this method are basin size, channel slope, surface storage and population density. Gage values were transposed using the drainage area proportioning formula $Q_1/Q_2 = (A_1/A_2)^{0.75}$, where Q_1 and Q_2 are the discharges at the transposed point and at the gage, respectively, and A_1 and A_2 are the drainage areas at the transposed point and at the gage, respectively (Reference 4). The weighting formula used was:

$$\log Q = N_1(\log Q_1) + N_r(\log Q_r) \; / \; N_1 + N_r$$

Where:

N_1 = Years of record for gage discharges
N_r = Equivalent years of record for Special Report 38
Q_1 = Transposed gage discharge
Q_r = Special Report 38 discharge

A summary of drainage area-peak discharge relationships for the stream studied in detail is shown in Table 1, "Summary of Discharges".

TABLE 1 - SUMMARY OF DISCHARGES

FLOODING SOURCE AND LOCATION	DRAINAGE AREA (sq. miles)	PEAK DISCHARGES (cfs) 10-YEAR	50-YEAR	100-YEAR	500-YEAR
MANTUA CREEK					
Upstream of State Route 45	30.6	1,490	3,845	5,515	12,200

3.2 Hydraulic Analyses

Analyses of the hydraulic characteristics of the flooding source studied in detail were carried out to provide estimates of the elevations of floods of the selected recurrence intervals along this flooding source.

BEST DOCUMENT AVAILABLE

For Mantua Creek, channel cross sections and partial overbank cross sections were obtained through field surveys. The overbanks were extended using topographic maps compiled from aerial photographs at a scale of 1:2,400 (Reference 5). All bridges and culverts were field surveyed to obtain elevation data and structural geometry.

Channel roughness factors (Manning's "n") used in the hydraulic computations were assigned on the basis of field inspection of various cross sections in the flood plain areas. For Mantua Creek, the main channel value was 0.028 and the overbank value ranged from 0.06 to 0.08.

Water-surface profiles were developed using the COE HEC-2 step-backwater computer program (Reference 6). Cross sections were located at close intervals above and below bridges and culverts in order to compute the significant backwater effects of those structures. Starting water-surface elevations for Mantua Creek were based on the 1-year tide level on the Delaware River.

Flood profiles were drawn showing computed water-surface elevations to an accuracy of 0.5 foot for floods of the selected recurrence intervals. Locations of selected cross sections used in the hydraulic analyses are shown on the Flood Profiles (Exhibit 1). For stream segments for which a floodway is computed (Section 4.2), selected cross-section locations are also shown on the Flood Boundary and Floodway Map (Exhibit 3).

All elevations used in this study are referenced to the National Geodetic Vertical Datum of 1929 (NGVD), formerly referred to as Sea Level Datum of 1929. Locations of the elevation reference marks used in the study are shown on the maps.

The hydraulic analyses for this study are based on the effects of unobstructed flow. The flood elevations shown on the profiles are valid only if hydraulic structures remain unobstructed and do not fail.

4.0 FLOOD PLAIN MANAGEMENT APPLICATIONS

The National Flood Insurance Program encourages state and local governments to adopt sound flood plain management programs. Therefore, each Flood Insurance Study includes a flood boundary map designed to assist communities in developing sound flood plain management measures.

4.1 Flood Boundaries

In order to provide a national standard without regional discrimination, the 100-year flood has been adopted by the FEMA as the base flood for purposes of flood plain management measures. The 500-year flood is employed

BEST DOCUMENT AVAILABLE

to indicate additional areas of flood risk in the community. For the stream studied in detail, the boundaries of the 100- and 500-year floods have been delineated using the flood elevations determined at each cross section; between cross sections, the boundaries were interpolated using topographic maps compiled from aerial photographs at a scale of 1:2,400, with a contour interval of 5 feet (Reference 5). In cases where the 100- and 500-year flood boundaries are close together, only the 100-year boundary has been shown.

For the streams studied by approximate methods, the boundaries of the 100-year flood were taken directly from the Flood Hazard Boundary Map for the Township of Mantua (Reference 7).

The boundaries of the 100- and 500-year floods are shown on the Flood Boundary and Floodway Map (Exhibit 3). Small areas within the flood boundaries may lie above the flood elevations and, therefore, may not be subject to flooding. Owing to limitations of the map scale and lack of detailed topographic data, such areas are not shown.

4.2 Floodways

Encroachment on flood plains, such as artificial fill, reduces the flood-carrying capacity, increases the flood heights of streams, and increases flood hazards in areas beyond the encroachment itself. One aspect of flood plain management involves balancing the economic gain from flood plain development against the resulting increase in flood hazard. For purposes of the Flood Insurance Program, the concept of a floodway is used as a tool to assist local communities in this aspect of flood plain management. Under this concept, the area of the 100-year flood is divided into a floodway and a floodway fringe. The floodway is the channel of a stream plus any adjacent flood plain areas that must be kept free of encroachment in order that the 100-year flood can be carried without substantial increases in flood heights. Minimum standards of the FEMA limit such increases in flood heights to 1.0 foot, provided that hazardous velocities are not produced. However, the State of New Jersey has established criteria limiting the increase in flood heights to 0.2 foot. Thus, a floodway having no more than a 0.2-foot surcharge has been delineated for this study. The floodway in this report is presented to local agencies as minimum standards that can be adopted or that can be used as a basis for additional studies.

The floodway presented in this study was computed on the basis of equal conveyance reduction from each side of the flood plains. The results of these computations are tabulated at selected cross sections for each stream segment for which a floodway is computed (Table 2). Portions of the floodway widths for Mantua Creek extend beyond the corporate limits.

BEST DOCUMENT AVAILABLE

BEST DOCUMENT AVAILABLE

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER SURFACE ELEVATION			
CROSS SECTION	DISTANCE[1]	WIDTH[2] (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
					(FEET NGVD)			
Mantua Creek								
A	1,840	369/139	2,840	2.1	10.6[3]	9.7[4]	9.9	0.2
B	3,420	328/288	2,731	2.1	10.8[3]	10.0[4]	10.2	0.2

[1]Feet above corporate limits
[2]Width/width within corporate limits
[3]Elevation computed based on starting water-surface elevation of one year tide
[4]Elevation computed without consideration of one year tide elevation or backwater effects from the Delaware Bay

TABLE 2

FEDERAL EMERGENCY MANAGEMENT AGENCY

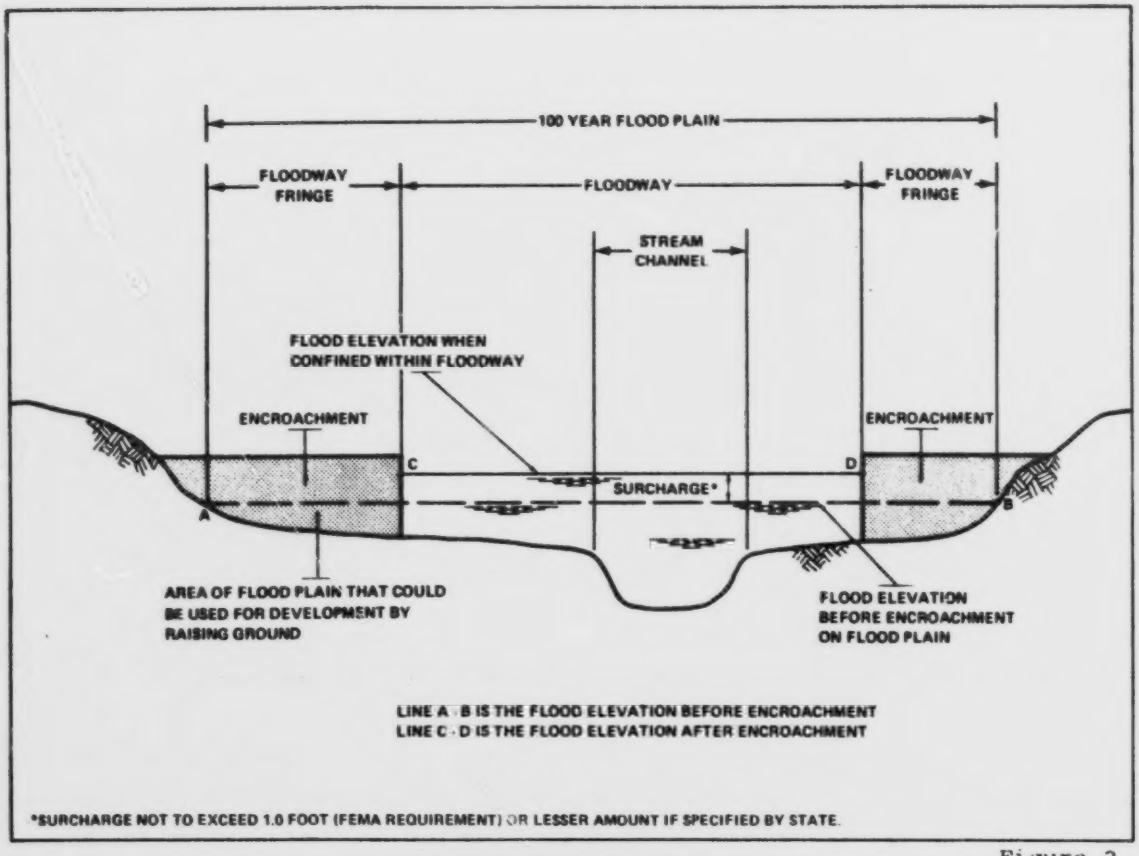
TOWNSHIP OF MANTUA, NJ
(GLOUCESTER CO.)

FLOODWAY DATA

MANTUA CREEK

As shown on the Flood Boundary and Floodway Map (Exhibit 3), the floodway widths were determined at cross sections; between cross sections, the boundaries were interpolated. In cases where the boundaries of the floodway and the 100-year flood are either close together or collinear, only the floodway boundary has been shown.

The area between the floodway and the boundary of the 100-year flood is termed the floodway fringe. The floodway fringe thus encompasses the portion of the flood plain that could be completely obstructed without increasing the water-surface elevation of the 100-year flood by more than 0.2 foot at any point. Typical relationships between the floodway and the floodway fringe and their significance to flood plain development are shown in Figure 2.


100 YEAR FLOOD PLAIN
FLOODWAY FRINGE
FLOODWAY
FLOODWAY FRINGE
STREAM CHANNEL
FLOOD ELEVATION WHEN CONFINED WITHIN FLOODWAY
ENCROACHMENT
ENCROACHMENT
C
D
SURCHARGE*
A
B
AREA OF FLOOD PLAIN THAT COULD BE USED FOR DEVELOPMENT BY RAISING GROUND
FLOOD ELEVATION BEFORE ENCROACHMENT ON FLOOD PLAIN
LINE A - B IS THE FLOOD ELEVATION BEFORE ENCROACHMENT
LINE C - D IS THE FLOOD ELEVATION AFTER ENCROACHMENT
*SURCHARGE NOT TO EXCEED 1.0 FOOT (FEMA REQUIREMENT) OR LESSER AMOUNT IF SPECIFIED BY STATE.

FLOODWAY SCHEMATIC

Figure 2

Near the mouths of streams studied in detail, floodway computations are made without regard to flood elevations on the receiving water body. The floodway for Mantua Creek was based solely on fluvial flow and therefore

BEST DOCUMENT AVAILABLE

the starting condition for this calculation was normal depth as determined by the slope/area method. Therefore, "With Floodway" elevations presented in Table 2 for certain downstream cross sections of Mantua Creek are lower than the regulatory flood elevations in that area, which must take into account a starting-water surface elevation of the 1-year tide from the Delaware River.

5.0 INSURANCE APPLICATION

In order to establish actuarial insurance rates, the FEMA has developed a process to transform the data from the engineering study into flood insurance criteria. This process includes the determination of reaches, Flood Hazard Factors (FHFs), and flood insurance zone designations for the flooding source affecting the Township of Mantua.

5.1 Reach Determinations

Reaches are defined as lengths of watercourses having relatively the same flood hazard, based on the average weighted difference in water-surface elevations between the 10- and 100-year floods. This difference does not have a variation greater than that indicated in the following table for more than 20 percent of the reach.

Average Difference Between 10- and 100-Year Floods	Variation
Less than 2 feet	0.5 foot
2 to 7 feet	1.0 foot
7.1 to 12 feet	2.0 feet
More than 12 feet	3.0 feet

The locations of the reaches determined for the flooding source in the Township of Mantua are shown on the Flood Profiles (Exhibit 1) and are summarized in the Flood Insurance Zone Data Table (Table 3).

5.2 Flood Hazard Factors

The FHF is the FEMA device used to correlate flood information with insurance rate tables. Correlations between property damage from floods and their FHFs are used to set actuarial insurance premium rate tables based on FHFs from 005 to 200.

The FHF for a reach is the average weighted difference between the 10- and 100-year flood water-surface elevations expressed to the nearest 0.5 foot, and shown as a three-digit code. For example, if the difference between water-surface elevations of the 10- and 100-year floods is 0.7

BEST DOCUMENT AVAILABLE

FLOODING SOURCE	PANEL[1]	ELEVATION DIFFERENCE[2] BETWEEN 1.0% (100-YEAR) FLOOD AND			FHF	ZONE	BASE FLOOD ELEVATION[3] (NGVD)
		10% (10 YR.)	2% (50 YR.)	0.2% (500 YR.)			
Mantua Creek Reach 1	03	-2.9	-1.5	+6.5	030	A6	Varies

[1]Flood Insurance Rate Map Panel
[2]Weighted Average
[3]Rounded to the nearest foot - see map

TABLE 3

FEDERAL EMERGENCY MANAGEMENT AGENCY

TOWNSHIP OF MANTUA, NJ
(GLOUCESTER CO.)

FLOOD INSURANCE ZONE DATA

MANTUA CREEK

BEST DOCUMENT AVAILABLE

foot, the FHF is 005; if the difference is 1.4 feet, the FHF is 015; if the difference is 5.0 feet, the FHF is 050. When the difference between the 10- and 100-year water-surface elevations is greater than 10.0 feet, accuracy for the FHF is to the nearest foot.

5.3 Flood Insurance Zones

After the determination of reaches and their respective FHFs, the entire incorporated area of the Township of Mantua was divided into zones, each having a specific flood potential or hazard. Each zone was assigned one of the following flood insurance zone designations:

Zone A: Special Flood Hazard Areas inundated by the 100-year flood, determined by approximate methods; no base flood elevations shown or FHFs determined.

Zone A6: Special Flood Hazard Areas inundated by the 100-year flood, determined by detailed methods; base flood elevations shown, and zones subdivided according to FHF.

Zone B: Areas between the Special Flood Hazard Area and the limits of the 500-year flood, including areas of the 500-year flood plain that are protected from the 100-year flood by dike, levee, or other water control structure; also, areas subject to certain types of 100-year shallow flooding where depths are less than 1.0 foot; and areas subject to 100-year flooding from sources with drainage areas less than 1 square mile. Zone B is not subdivided.

Zone C: Areas of minimal flooding.

Table 4, "Flood Insurance Zone Data," summarizes the flood elevation differences, FHFs, flood insurance zones, and base flood elevations for the flooding source studied in detail in the Township of Mantua.

5.4 Flood Insurance Rate Map Description

The Flood Insurance Rate Map for the Township of Mantua is, for insurance purposes, the principal result of the Flood Insurance Study. This map (published separately) contains the official delineation of flood insurance zones and base flood elevation lines. Base flood elevation lines show the locations of the expected whole-foot water-surface elevations of the base (100-year) flood. This map is developed in accordance with the latest flood insurance map preparation guidelines published by the FEMA.

BEST DOCUMENT AVAILABLE

6.0 OTHER STUDIES

Flood Insurance Studies are currently being prepared for the adjacent Townships of East Greenwich and West Deptford (References 8 and 9). The results of these studies will be in exact agreement with the results of this study.

The Philadelphia District of the COE has completed two studies of the Mantua Creek basin. Because of hydrology revisions, however, they were not utilized in this study (References 10 and 11).

This study is authoritative for purposes of the Flood Insurance Program, and the data presented here either supersede or are compatible with previous determinations.

7.0 LOCATION OF DATA

Survey, hydrologic, hydraulic, and other pertinent data used in this study can be obtained by contacting the office of the Insurance and Mitigation Division of the Federal Emergency Management Agency, Regional Director, Region II Office, 26 Federal Plaza, Room 19-100, New York, New York 10278.

8.0 BIBLIOGRAPHY AND REFERENCES

1. New Jersey Office of Business Economics, Department of Labor and Industry, Population Estimates for New Jersey, Official State Estimates, July 1, 1977, Trenton, New Jersey, October 1978.

2. State of New Jersey, Department of Environmental Protection, Division of Water Resources, in cooperation with the U. S. Geological Survey, Special Report 38, Magnitude and Frequency of Floods in New Jersey with Effects of Urbanization by Stephen J. Stankowski, Trenton, New Jersey, 1974.

3. U. S. Department of the Interior, Geological Survey, Log-Pearson Type III Flood Frequency Analysis, Washington, D. C., August 1978.

4. Johnstone and Cross, Elements of Applied Hydrology, New York, 1949.

5. Topographic Data Corporation of Berlin, New Jersey, Topographic Maps Compiled from Aerial Photographs, Scale 1:2,400, Contour Interval 5 Feet: Township of Mantua, New Jersey, 1978.

6. U. S. Army Corps of Engineers, Hydrologic Engineering Center, HEC-2 Water Surface Profiles, Generalized Computer Program, Davis, California, October 1973.

BEST DOCUMENT AVAILABLE

7. U. S. Department of Housing and Urban Development, Federal Insurance Administration, Flood Hazard Boundary Map, Township of Mantua, Gloucester County, New Jersey, Washington, D. C, July 15, 1977.

8. Federal Emergency Management Agency, Federal Insurance Administration, Flood Insurance Study, Township of East Greenwich, Gloucester County, New Jersey (Unpublished).

9. Federal Emergency Management Agency, Federal Insurance Administration, Flood Insurance Study, Township of West Deptford, Gloucester County, New Jersey (Unpublished).

10. U. S. Army Corps of Engineers, Philadelphia District, Flood Plain Information - Mantua Creek, Philadelphia, Pennsylvania, November 1972.

11. U. S. Army Corps of Engineers, Philadelphia District, Mantua Creek Basin Hydrology, Philadelphia, Pennsylvania, July 1978.

The Evening Bulletin, Philadelphia, Pennsylvania, September 2, 1940.

The Philadelphia Inquirer, Philadelphia, Pennsylvania, September 2, 1940.

Simpson, Hazel, Under Four Flags, Old Gloucester County, 1686-1964, Camden, New Jersey, 1968.

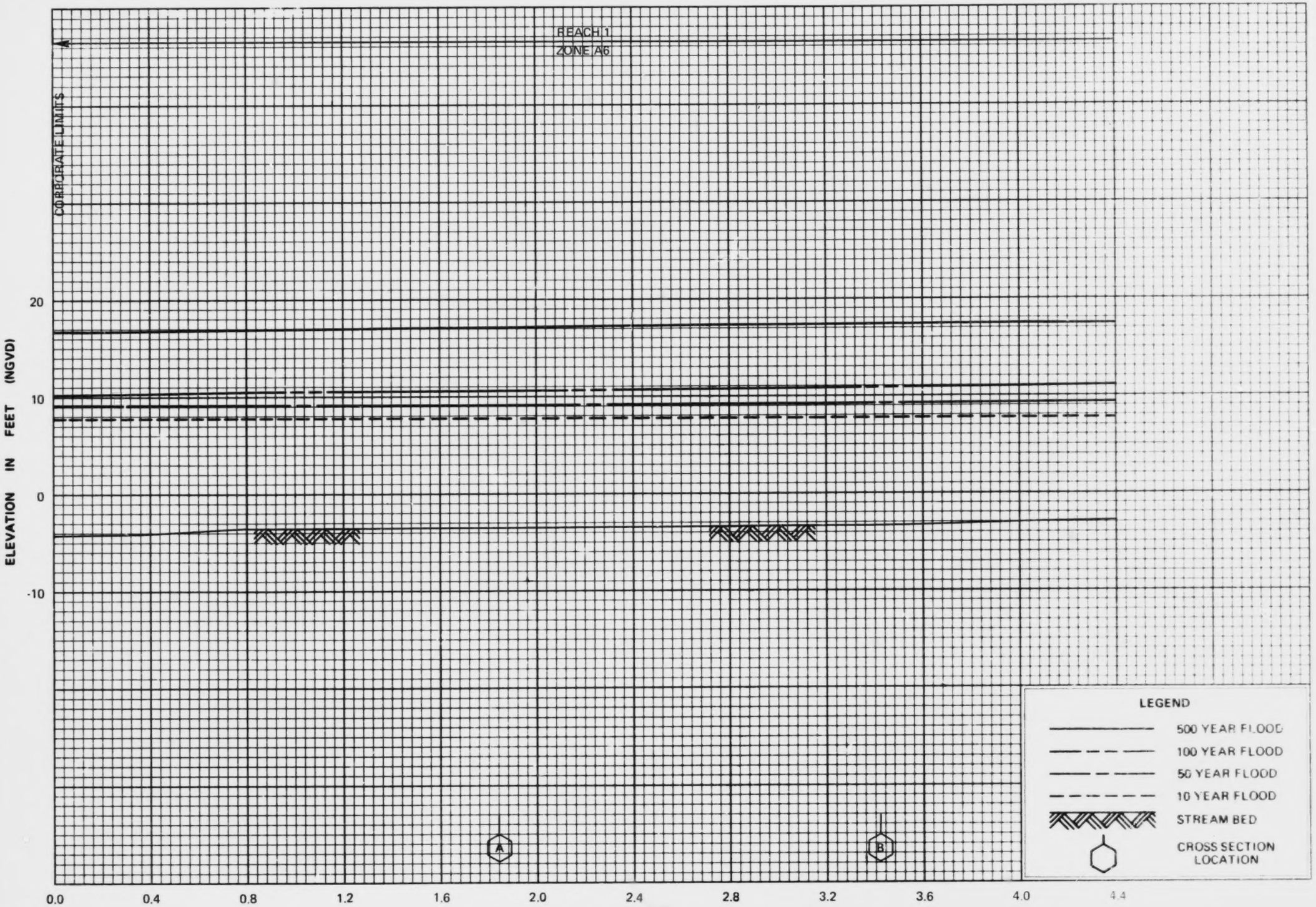
U. S. Army Corps of Engineers, Hydrologic Engineering Center, Regional Frequency Computation, Computer Program 723-X6-L2350, Davis California, December 1968, Updated July 1979.

Water Resources Council, "Guidelines for Determining Flood Flow Frequency," Bulletin 17, Washington, D. C., March 1976.

Widmer, Kemble, The Geology and Geography of New Jersey, Trenton, New Jersey, 1964.

BEST DOCUMENT AVAILABLE

BEST DOCUMENT AVAILABLE



FLOOD PROFILES

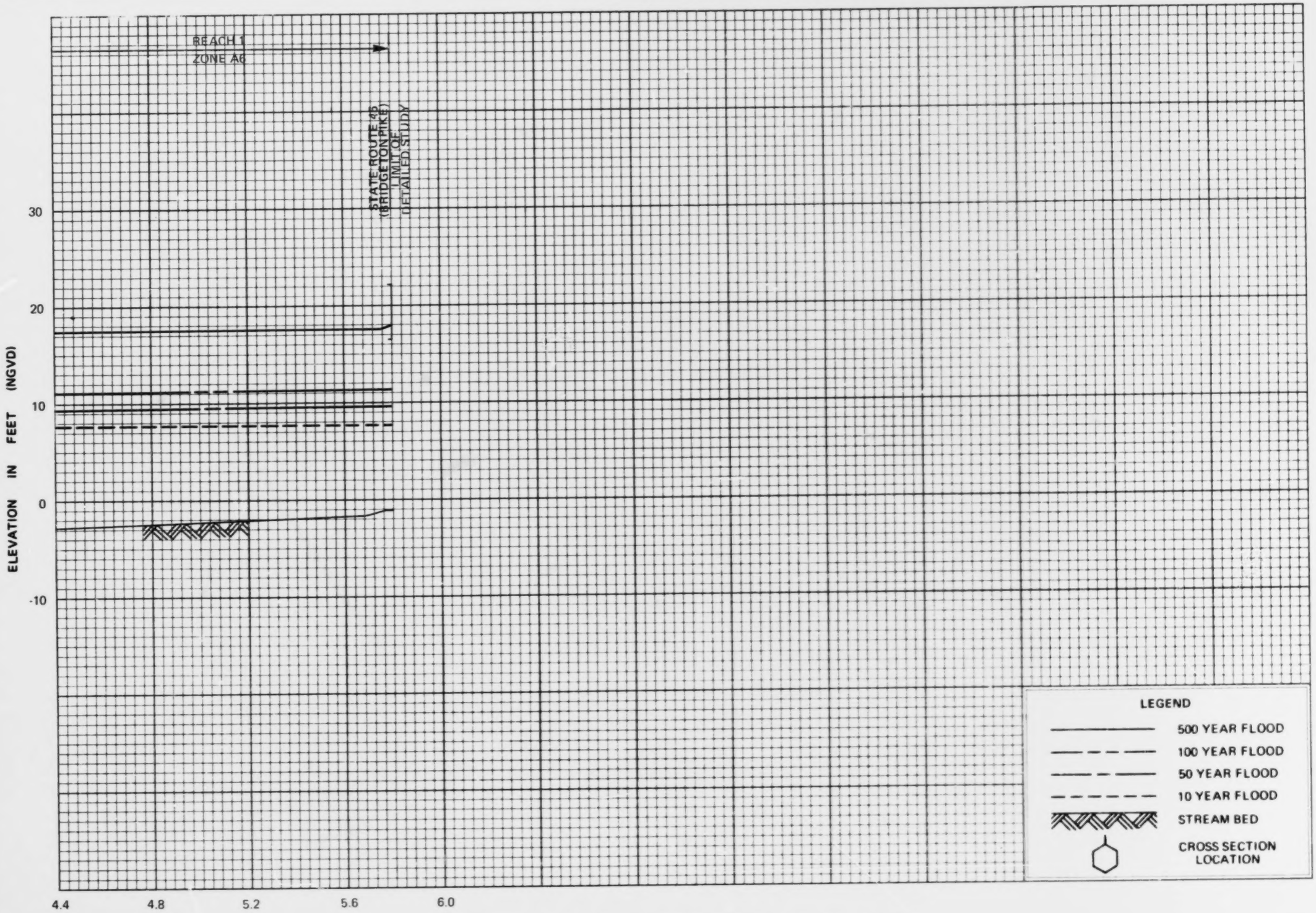
MANTUA CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

TOWNSHIP OF MANTUA, NJ
(GLOUCESTER CO.)

01P

BEST DOCUMENT AVAILABLE



FLOOD PROFILES

MANTUA CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

TOWNSHIP OF MANTUA, NJ
(GLOUCESTER CO.)

02P